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# United States Department of Agriculture,

OFFICE OF EXPERIMENT STATIONS—Circular 91.

A. C. TRUE, Director.

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## SECONDARY EDUCATION IN AGRICULTURE IN THE UNITED STATES.<sup>a</sup>

I propose first to outline briefly the present status of secondary education in agriculture in the United States. This matter has been most recently summed up in Circular No. 83 of the Office of Experiment Stations. That summary represents the condition of things up to about the beginning of the year 1909. It is difficult now to keep pace with the spread of the movement for secondary instruction in agriculture in this country. The introduction of such instruction into the secondary schools is now proceeding so rapidly and so widely that the Office of Experiment Stations is no longer able to keep a complete current record of the progress. There was a time when we felt that we knew substantially all the institutions that were giving secondary instruction in agriculture. Now we are sure we do not. In speaking of the matter, therefore, I may make some statements which would seem to members of this association inadequate, and I hope they will undertake to supplement the information that I have to give as far as the different States are concerned.

The summing up of the progress of agricultural education for the fiscal year ended June 30, 1909, has not yet been made, but a summary prepared in the Office of Experiment Stations in May, 1909, showed the following conditions regarding the progress of secondary education in agriculture:

Twelve years ago, when Secretary Wilson came to the United States Department of Agriculture, there were but 10 agricultural high schools in the country, and the teaching of agriculture in normal schools or in public elementary schools had merely begun. To-day

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<sup>a</sup> Address of A. C. True, Director Office of Experiment Stations, before the Association of American Agricultural Colleges and Experiment Stations at Portland, Oreg., August 18, 1909, and adopted by the association as containing a statement of principles which it approves regarding secondary education in agriculture.

there are 60 agricultural high schools, or definitely secondary agricultural courses in colleges; 346 public high schools teaching agriculture; and 119 state or county normal schools and 16 agricultural colleges training young men and women to teach agriculture. In addition to these there are a number of private institutions giving secondary instruction in agriculture, and 16 institutions offering correspondence courses or reading courses which are practically of secondary grade, making in all about 500 institutions giving secondary instruction in agriculture.

For the purposes of this discussion these institutions may be classified as follows:

(1) The agricultural colleges, where the instruction is given through definitely organized agricultural high schools, as in Minnesota, or through short or special courses of different kinds. The agricultural colleges as a body are giving much secondary instruction in agriculture. In some cases this is definitely organized as such, and in other cases it is given under a variety of names. (2) Agricultural high schools in congressional or other large districts, as in Minnesota and Alabama. (3) County agricultural high schools, as in Michigan and Wisconsin. (4) State or county normal schools. (5) Ordinary high schools either in cities, townships, or counties. (6) Private colleges and schools. (7) Correspondence schools.

Looking now a little more closely at some of the work under these different heads, we may say that the first special agricultural high school organized in connection with a college was the Minnesota School of Agriculture, established in 1888. Now similar schools or short courses are maintained in connection with colleges of agriculture in Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Idaho, Kentucky, Louisiana, Maine, Maryland, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Porto Rico, Rhode Island, South Dakota, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. Whether that is a complete list or not, it shows quite a wide and general diffusion of secondary instruction through the agricultural colleges throughout the country.

Of the separate agricultural high schools receiving state aid there are, first, the congressional-district agricultural high schools. These were established first in Alabama, and this State now has nine such schools. Each of these schools has a branch experiment station connected with it, is provided with land for experimental and other purposes, receives an annual appropriation of \$4,500 from the State for maintenance, and has a considerable equipment of buildings, animals, and machinery. The course of study extends over four years and corresponds in grade to that of other high schools in this State.



Georgia has eleven of these district agricultural schools, which are supported from the proceeds of the state oil and fertilizer inspection fees, amounting to about \$7,500 annually for each school, and they are provided with land, buildings, equipment, and other facilities through local contributions. Each school has not less than 200 acres of land. The course of study in these schools extends over four years and includes really two years of grammar-school or grade-school work and two years of high-school work. Other States having similar schools are California, Minnesota, New York, and Oklahoma. Arkansas has made definite provision for four such schools.

The county agricultural schools were first established in Wisconsin in 1902. These schools have been equipped at the expense of the counties where they are located, but the State aids each school to the extent of \$4,000 a year, to be applied to the running expenses. The course of study in each school extends over two years and is of quite a practical character, including agriculture, wood working, iron working, and domestic science, besides local United States history, civil government, and commercial arithmetic. County agricultural schools are also found in Maryland, Michigan, and Mississippi.

The statistics for the normal schools have already been given, showing that over 100 normal schools in the country are giving instruction in agriculture. This instruction is quite different in character in different schools. In some cases there is a regular course by a special instructor who is a graduate of an agricultural college. In other cases the teaching of agriculture has been taken up by the science teacher.

In ordinary high schools, of which 300 or 400 are now giving some instruction in agriculture, the instruction in that subject is also quite varied. In some cases, as in Louisiana, Maryland, Minnesota, and Virginia, the high schools have been reorganized with reference to making the agricultural instruction a prominent feature of the course, but as a general rule so far the instruction has been treated simply as an additional feature and more or less emphasis placed upon it according to the amount of interest it has awakened. Only in a comparatively few cases yet are there specially trained teachers of agriculture in the high schools.

Among the private institutions that are giving special attention to agriculture may be mentioned the National Farm School at Doylestown, Pa.; the Mount Hermon School at Northfield, Mass.; the Smith Agricultural School at Northampton, Mass., which has recently been organized; and the Winona Agricultural and Technical Institute at Winona Lake, Ind. In all of these institutions and in some others special attention is being given to secondary instruction in agriculture and the courses are quite elaborately laid out and organized.

This movement is also reaching the girls in a special way. In the ordinary high schools I judge the courses in agriculture are open to the girls as well as to the boys if they choose to take them, but in a number of the special schools some definite attention is being given to the special requirements of women and girls for secondary instruction, and that movement is affecting not only public institutions, like the schools in Minnesota, for example, but reaching out to the private institutions. Thus we have, for example, a school of horticulture and landscape gardening for women at Groton, Mass.; a course in horticulture at Wellesley College, and courses in horticulture and agriculture in women's colleges of industrial arts at Milledgeville, Ga.; Montevallo, Ala.; Rock Hill, S. C.; and Denton, Tex., as showing a little of the breadth of this movement in different sections of the country.

In a general way, though very inadequately, I have stated the present scope of instruction in agriculture in secondary schools in this country. It must be said that the movement is still in an experimental stage, and the most encouraging thing about it now is that we have a sufficient number of experiments in this kind of education in progress so that we shall hope to have some pretty definite results worked out from experience within a comparatively short time. I think we should all agree that it is now too early to say what the American system of secondary education in agriculture will ultimately be. From the study which I have been able to make of this subject, I am inclined to sum up the matter from a somewhat ideal point of view in the following statement:

(1) Agriculture, including horticulture and forestry (and it is well to bear in mind that where I use the term agriculture I would use it in the ordinary sense to include the whole subject), should be a regular part of public secondary education; (2) the unity of the educational system should be maintained, but there should be sufficient elasticity of curricula to meet the various needs of the people; (3) the standard curriculum of secondary schools having agricultural courses should conform in a general way to that adopted for the general school system of the State; (4) the standard agricultural courses, whether in the ordinary high schools or in special schools, should not be narrowly vocational, but should aim to fit the pupils for life as progressive, broad-minded, and intelligent men and women, as well as good farmers and horticulturists; (5) the standard courses in agricultural secondary schools should be so organized as to form a natural and proper preparation for entrance to agricultural colleges.

The conditions of entrance requirements to colleges are, in my judgment, far from satisfactory. It is not likely that we have reached the ultimate plan for the preparation of the great mass of students who



in the future will desire college courses. It seems certain that when the so-called vocational subjects are properly organized and taught in the secondary schools they will be generally recognized as having much pedagogical value. This is especially true of agriculture, which is a subject embracing much of general human interest. Even under present conditions the agricultural colleges would do well to give credit in their entrance requirements for agricultural subjects properly taught in secondary schools.

The agricultural college should have a definite legal relation to our public school system, and especially to the courses or schools of agriculture of secondary and elementary grades. By this I mean that the state legislatures should take definite action recognizing that agricultural colleges have a definite function to aid in the organization of a proper system of secondary instruction in agriculture, and help the secondary schools in that work.

One difficulty now in the progress of this movement is that in quite a number of States the legislation is such that the agricultural colleges, if they take any part in it, have to "butt in." The whole matter of secondary education is in many States intrusted to the state department of education, as far as the State deals with the matter. I think that ought to be remedied. It may be said that that is only part of a wider thing. I do not believe that we have yet in this country considered definitely enough the proper relation of our universities and colleges to the more elementary education. These higher institutions in many States yet stand too much apart from our general system of education. It is very desirable, it seems to me, that they should be recognized by statute everywhere as an essential part of our system of public education. And while that general movement is proceeding the friends of agricultural education should urge that the agricultural colleges should have a definite part in the organization and maintenance of systems of agricultural education in public schools.

Agricultural colleges will have to do secondary work to a considerable extent for some time to come. We can not, in my judgment, jump immediately in all our agricultural colleges to a state of things where all the secondary work is excluded. This should, however, be definitely organized as separate and distinct from the college work. The aim should be to have all secondary work relegated to secondary schools, entirely separate from the colleges, when such schools are efficiently organized with reference to instruction in agriculture.

Agriculture should be generally introduced into the ordinary high schools. There should also be a limited number of special agricultural high schools in the different States. These should be so limited in number that they will be organized with reference to large districts.

I do not believe it is either necessary or desirable to organize such schools with the county as the unit. Experience so far points to the fact that the county is too small a unit for the proper equipment and maintenance of a thoroughgoing agricultural high school. These special schools should have a relatively large agricultural faculty and an adequate equipment, so that students going to them will not only have offered to them a standard course of high school or secondary grade, but will also have opportunity to specialize to a certain extent along different agricultural lines. I believe that such schools are needed, because they will in a way set the pace for secondary education in agriculture, and will help rather than hinder the general introduction of agriculture into the ordinary high schools. Besides serving more general purposes, they will attract a good many of the more mature students, who are not ready or financially able to go to college, but desire to go somewhere to get some definite instruction in agriculture, and who are really too old to feel comfortable in the ordinary high school. These schools will also aid in the preparation of teachers and school officers for the rural schools; so that in a way these special agricultural schools will more fully meet the need which is now being met to a limited extent by the special and short courses in the agricultural colleges.

In speaking of this subject, we must, of course, all the time remember the great extent which this movement will have when once it is in complete operation. It is a comparatively easy matter now for the colleges to take care of this short-course work and a considerable amount of secondary work, because the number of students so far has been comparatively limited in each State. But as we approach the time when we are to have half a million students in agriculture in secondary schools it is going to be a very different proposition. In the near future the colleges will have all they can do to take care of the students in regular college courses in agriculture. The special agricultural schools will fill a great need by attracting the more mature students who would not go to the ordinary high schools, and the ordinary high schools will have plenty of agricultural students of proper high-school age.

As I said, I believe the standard courses in these special agricultural schools should not be narrowly vocational, but should conform, in a general way, to the general standard for the high-school system in the State, and they should be organized so as to connect them definitely with the general educational system of the State. To do this it will probably be found necessary in the case of schools that have shortened the school year to twenty-four weeks of six days each, instead of thirty-six weeks of five days each, to add another year to the standard course, making it five years instead of four. But it



would be desirable that besides the standard courses which would prepare the student for college or for life, as the case might be, such schools should have shorter courses more purely vocational. That has been found necessary and desirable with reference to the technical schools of secondary grade in the cities. Our people have demanded, as a rule, that such schools be made real high schools and have courses generally equivalent to those of the ordinary high schools. But along with these standard courses it has been found an advantage to have short courses in which the student gives a large share of his time to vocational work.

Some time ago I was asked by an association of horticulturists to take part with a committee in considering the matter of special instruction in horticulture. In connection with the work of that committee there was prepared the syllabus of a four-year secondary course in horticulture, which was thought to be appropriate to the special agricultural high schools in which horticulture would be a prominent subject. I have contemplated preparing the same kind of an outline for a course in agriculture, but I have not had the time to do that. If I may tax the patience of the association a little further, I would like to call attention to the principal features of this four-year course in horticulture, and have it borne in mind all the time that the same plan, in my judgment, might be adapted to a four-year course in what we ordinarily call "agriculture," as distinguished from horticulture.

*Syllabus of a four-year secondary course in horticulture.*

REQUIRED SUBJECTS.

Subjects.	Units. <sup>a</sup>	Hours per week.				Total hours. <sup>b</sup>
		First year.	Second year.	Third year.	Fourth year.	
English.....	3	5	5	3	2	540
Algebra.....	1	5	.....	.....	.....	180
Geometry.....	1	.....	5	.....	.....	180
History.....	1	.....	.....	2	3	180
Botany.....	1	5	.....	.....	.....	180
Chemistry.....	1	.....	5	.....	.....	180
French or German.....	2	.....	.....	5	5	360
Horticulture.....	4	5	5	5	5	720
Elective.....	2	.....	.....	5	5	360
Total.....	.....	.....	.....	.....	.....	2,880

<sup>a</sup> A unit consists of 180 hours, i. e., 5 hours a week for 36 weeks.

<sup>b</sup> Throughout this syllabus recitation periods of 45 minutes are designated as "hours." In laboratory practice, demonstrations, drawing, bookkeeping, surveying, and horticultural practice an hour is a double period or 90 minutes.

*Syllabus of a four-year secondary course in horticulture—Continued.*

## ELECTIVE SUBJECTS.

Subjects.	Units.	Hours per week.	Total hours.
Drawing.....	$\frac{1}{5}$	1 hour 1 year.....	36
Bookkeeping.....	$\frac{1}{5}$	do.....	36
Civics.....	$\frac{2}{5}$	2 hours 1 year.....	72
Solid geometry.....	$\frac{1}{2}$	5 hours $\frac{1}{2}$ year.....	90
Plain trigonometry and surveying.....	$\frac{4}{5}$	2 hours 2 years.....	144
French or German, horticultural reading.....	1	5 hours 1 year.....	180
Botany, chemistry, or physics.....	1	do.....	180
Horticulture or elementary forestry. <sup>a</sup>		1 to 5 hours third and fourth years.	

<sup>a</sup> These are in addition to the 720 hours of required subjects in horticulture and are offered to permit specialization in some branch of horticulture by students not intending to take a college course in horticulture.

*Hours devoted to subjects included under "Horticulture" in the course of study.*

## REQUIRED SUBJECTS FOR ALL STUDENTS IN HORTICULTURE.

Subjects.	Units.	Hours per week.				Total hours.
		First year.	Second year.	Third year.	Fourth year.	
Principles of agriculture.....	$\frac{2}{5}$	2	.....	.....	.....	72
Propagation and breeding.....	$\frac{3}{5}$	2	1	.....	.....	108
Greenhouse construction and management.....	$\frac{1}{5}$	.....	.....	1	.....	36
Economic entomology.....	$\frac{2}{5}$	.....	2	.....	.....	72
Plant diseases.....	$\frac{2}{5}$	.....	1	1	.....	72
Horticultural machinery.....	$\frac{1}{5}$	1	.....	.....	.....	36
Sprays and spraying.....	$\frac{1}{5}$	.....	1	.....	.....	36
Economics of horticulture.....	$\frac{1}{5}$	.....	.....	.....	1	36
Subjects to be added from sub-joined list A.....	$1\frac{2}{5}$	.....	.....	3	4	252
Total.....		.....	.....	.....	.....	720

## A.—SUBJECTS FROM WHICH ELECTION MUST BE MADE TO MAKE UP THE REQUIRED 720 HOURS IN HORTICULTURE.

Subjects.	Hours per week.		Total hours.
	Third year.	Fourth year.	
Pomology.....	2	2	72 or 144
Olericulture.....	2	2	72 or 144
Floriculture.....	2	2	72 or 144
Landscaping.....	1	2	36 or 108
Agricultural engineering.....	.....	2	72

NOTE.—From these subjects 36 to 180 hours may also be selected as part of the electives provided for in the course in horticulture, page 7.

*Syllabus of a two-year secondary course in horticulture.*

Subjects.	Hours per week.		Total hours.
	First year.	Second year.	
English.....	5	2	252
Algebra.....		2	72
Bookkeeping.....	1		36
Botany.....	5		180
Chemistry.....		5	180
Horticulture.....	9	11	720
Total.....			1,440

**A FOUR-YEAR SECONDARY COURSE IN AGRICULTURE.**

Since the above address was given a secondary course in agriculture has been prepared and is given herewith. The two courses are alike except in a few particulars relating to the technical phases of their work. The main difference arises from the substitution of agriculture for horticulture, but there is another difference due to the fact that agriculture is a much broader subject than horticulture. In consequence of this difference a larger percentage of required work in agriculture seems to be necessary to give the students a general knowledge of the subject before specialization is begun.

Thus, as shown by the tables outlining the subjects included under horticulture and agriculture, respectively, in the horticultural course there is a total of 468 hours of required horticulture and 252 hours of optional work in pomology, olericulture, floriculture, landscaping, and rural engineering, while in the agricultural course there are 540 hours of required agriculture and only 180 hours of optional work to be selected from courses in farm crops, animal husbandry, dairying, horticulture, forestry, agricultural engineering, rural economics, and plant breeding.

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*Syllabus of a four-year secondary course in agriculture.*

## REQUIRED SUBJECTS.

Subjects.	Units. <sup>a</sup>	Hours per week.				Total hours. <sup>b</sup>
		First year.	Second year.	Third year.	Fourth year.	
English.....	3	5	5	3	2	540
Algebra.....	1	5	.....	.....	.....	180
Geometry.....	1	.....	5	.....	.....	180
History.....	1	.....	.....	2	3	180
Botany.....	1	5	.....	.....	.....	180
Chemistry.....	1	.....	5	.....	.....	180
French or German.....	2	.....	.....	5	5	360
Agriculture.....	4	5	5	5	5	720
Elective.....	2	.....	.....	5	5	360
Total.....	.....	.....	.....	.....	.....	2,880

<sup>a</sup> A unit consists of 180 hours, i. e., 5 hours per week for 36 weeks.

<sup>b</sup> Throughout this syllabus recitation periods of 45 minutes are designated as "hours". In laboratory practice, demonstrations, bookkeeping, surveying and agricultural practice an hour is a double period or 90 minutes.

## ELECTIVE SUBJECTS.

Subjects.	Units.	Hours per week.	Total hours.
Drawing.....	1/5	1 hour 1 year.....	36
Bookkeeping.....	1/5	.....do.....	36
Civics.....	2/5	2 hours 1 year.....	72
Solid geometry.....	1/2	5 hours 1/2 year.....	90
Plane trigonometry and surveying.....	4/5	2 hours 2 years.....	144
French or German.....	1	5 hours 1 year.....	180
Botany, chemistry, or physics.....	1	.....do.....	180
Agriculture, horticulture, or elementary forestry. <sup>c</sup>	.....	1 to 5 hours third and fourth years.	.....

<sup>c</sup> These are in addition to the 720 hours of required subjects in agriculture and are offered to permit specialization in some branch of agriculture by students not intending to take a college course in agriculture.

*Hours devoted to subjects included under "Agriculture" in the course of study.*

## REQUIRED SUBJECTS FOR ALL STUDENTS IN AGRICULTURE.

Subjects.	Units.	Hours per week.				Total hours.
		First year.	Second year.	Third year.	Fourth year.	
The plant and its environment..	2/5	2	.....	.....	.....	72
Farm crops.....	1/5	1	.....	.....	.....	36
Agricultural engineering.....	2/5	1	.....	1	.....	72
Horticulture and forestry.....	1/5	1	.....	.....	.....	36
Economic entomology.....	2/5	.....	2	.....	.....	72
Animal husbandry.....	2/5	.....	2	.....	.....	72
Dairying.....	1/5	.....	1	.....	.....	36
Diseases of plants and animals..	2/5	.....	.....	2	.....	72
Farm management.....	2/5	.....	.....	.....	2	72
Subjects to be added from the subjoined list A.....	1	.....	.....	2	3	180
Total.....	.....	.....	.....	.....	.....	720

*Hours devoted to subjects included under "Agriculture" in the course of study—Cont'd.*

**A.—SUBJECTS FROM WHICH SELECTION MUST BE MADE TO MAKE UP THE REQUIRED 720 HOURS IN AGRICULTURE.**

Subjects.	Hours per week.		Total hours.
	Third year.	Fourth year.	
Farm crops.....	2	2	72 or 144
Animal husbandry.....	2	2	72 or 144
Dairying.....	2	2	72 or 144
Horticulture.....	2		72
Forestry.....	2		72
Agricultural engineering.....		2	72
Rural economics.....	1	1	36 or 72
Plant breeding.....	1	2	36 or 108

NOTE.—From these subjects 36 to 180 hours may also be selected as part of the electives provided for in the course in agriculture, page 10.

*Syllabus of a two-year secondary course in agriculture.*

Subjects.	Hours per week.		Total hours.
	First year.	Second year.	
English.....	5	2	252
Algebra.....		2	72
Bookkeeping.....	1		36
Botany.....	5		180
Chemistry.....		5	180
Agriculture.....	9	11	720
Total.....			1,440

Recommended for publication.

A. C. TRUE, *Director.*

Publication authorized.

JAMES WILSON, *Secretary of Agriculture.*

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